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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/562,618

05/15/2006

Jan Boer

Boer 7-3-2-3

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EXAMINER

CASCA, FRED A

ART UNIT

PAPER NUMBER

2617

MAIL DATE

DELIVERY MODE

06/16/2010

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<p align="center"><b>Advisory Action</b> <b>Before the Filing of an Appeal Brief</b></p>	<p><b>Application No.</b> 10/562,618</p>	<p><b>Applicant(s)</b> BOER ET AL.</p>	
	<p><b>Examiner</b> FRED A. CASCA</p>	<p><b>Art Unit</b> 2617</p>	

**--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

THE REPLY FILED 04 June 2010 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to or on the same day as filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

- a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.  
b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### NOTICE OF APPEAL

2. ☐ The Notice of Appeal was filed on \_\_\_\_\_. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

#### AMENDMENTS

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because  
(a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);  
(b) ☐ They raise the issue of new matter (see NOTE below);  
(c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or  
(d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: \_\_\_\_\_. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).  
5. ☐ Applicant's reply has overcome the following rejection(s): \_\_\_\_\_.  
6. ☐ Newly proposed or amended claim(s) \_\_\_\_\_ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).  
7. ☐ For purposes of appeal, the proposed amendment(s): a) ☐ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.  
The status of the claim(s) is (or will be) as follows:  
Claim(s) allowed: \_\_\_\_\_.  
Claim(s) objected to: \_\_\_\_\_.  
Claim(s) rejected: \_\_\_\_\_.  
Claim(s) withdrawn from consideration: \_\_\_\_\_.

#### AFFIDAVIT OR OTHER EVIDENCE

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).  
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).  
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

#### REQUEST FOR RECONSIDERATION/OTHER

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because: see below.  
12. ☐ Note the attached Information *Disclosure Statement*(s). (PTO/SB/08) Paper No(s). \_\_\_\_\_.  
13. ☐ Other: \_\_\_\_\_.

/VINCENT P. HARPER/  
Supervisory Patent Examiner, Art Unit 2617

Applicant's arguments filed June 04, 2010 have been fully considered but they are not persuasive. In response to arguments that Li makes no reference to diagonal loading and that the combination of Li and Sandell does not disclose diagonal loading across multiple antennas, the examiner respectfully disagrees.

The examiner asserts that the applicant's disclosure does not provide a clear definition for diagonal loading. The applicant's specification on page 5, lines 21-23, states that "The diagonal loading of subcarriers may also be referred to as subcarrier interleaving or multiplexing the subcarriers across terminals." Thus, the examiner interprets the diagonal loading of subcarriers as "subcarrier interleaving" or "subcarrier multiplexing." The examiner further asserts that an OFDM channel model comprises subcarrier interleaving or multiplexing.

In providing evidence that an OFDM channel includes subcarrier interleaving, the applicant is referred to the chapter 3 of the text, Fundamental of Wireless Communication by David Tse (ISBN-13 978 0-521-84527-4), particularly section 3.4.4. Tse teaches that in OFDM a large bandwidth is divided into smaller (e.g.,  $N$ ) sub-bands and then each sub-band is used in carrying a smaller portion of a large input data. Further, the smaller portions of the input data is being interleaved across the transmit and the receive antennae. This inherent interleaving function of OFDM is for maximizing channel capacity and eliminating crosstalk. The examiner further refers the applicant to reference Terable et al. (U.S. Pub. No. 2007/0223364), particularly Par. [0119] in providing evidence that interleaving is inherent in OFDM. Based on the above definitions by Tse, Terable and the applicant's specification on page 5, lines 21-23, the examiner concludes that Li's disclosure of OFDM communication channel inherently includes "diagonal loading of subcarriers."

Applicant's arguments on page 8 of the remarks filed on 06/04/2010 that, "Tse describes the cited interleaving function in section 3.2 and, in particular, FIG. 3.5. As shown in FIG. 3.5, each portion of each codeword  $x_0$ - $x_3$  is

interleaved such that each of the four portions of codeword  $x_0$  reside in each of the first locations of the four interleaved codewords. Similarly, each of the four portions of codeword  $x_1$  reside in each of the second locations of the four interleaved codewords, each of the four portions of codeword  $x_2$  reside in each of the third locations of the four interleaved codewords, and each of the fourth portions of codeword  $x_3$  reside in each of the last locations of the four interleaved codewords. Thus, while the codewords are interleaved, they are not diagonally loaded; diagonally loading would result in a portion of each codeword residing in a different location in each interleaved codeword, i.e., for example, a first portion of  $x_1$  would reside in a first location of a first interleaved codeword, a second portion of  $x_1$  would reside in a second location of a second interleaved codeword, and so on. (See, FIG. 4 and the associated text of the present disclosure.)," have been fully considered, but they are not persuasive. The examiner asserts that based on the applicant's disclosure on page 5 of the specification, the diagonal loading is equivalent as subcarrier interleaving. Thus, Li discloses diagonal loading.

In response to arguments that Sandell's MIMO-OFDM system does not disclose diagonal loading, the examiner respectfully disagrees.

The examiner asserts that since Sandell's MIMO-OFDM inherently includes both OFDM and MIMO channel models, Sandell's OFDM portion of the MIMO-OFDM teaches the claimed subcarrier interleaving which is inherent in OFDM, as discussed above with reference Tse and Terable.